

What is claimed is:

1                   1.     A wireless communication device for communicating with at least  
2 one other device, said wireless communication device comprising:  
3                   a CPU,  
4                   a memory, a first timer and a second timer,  
5                   a bus, connecting said CPU, said memory, to a communications interface;  
6                   wherein when said wireless communications device requests preferential  
7 use of a communication channel, said first timer is set with a timeout value less than said  
8 second timer, such that a periodic transmission of a priority request is made by said CPU  
9 via said communication interface at expiration of said first timer provided that said  
10 second timer has not expired.

1                   2.     A communication device for communicating with a control station,  
2 said device having a control section comprising:  
3                   a CPU,  
4                   a memory,  
5                   a bus, connecting said CPU, said memory to a communications interface;  
6                   wherein when said communication device requests preferential use of a  
7 communication channel, said channel having been assigned by said control station, said  
8 CPU periodically causes sending of a priority request to said control station via said  
9 communications interface.

1                   3.     A mobile station for wireless communication with a base station,  
2 said mobile station having a control section comprising:  
3                   a CPU,  
4                   a memory,  
5                   a bus, connecting said CPU, said memory to a transmission/reception  
6 processor;  
7                   wherein when said mobile station requests preferential use of a wireless  
8 communication channel, said wireless communication channel having been assigned by  
9 said base station, said CPU periodically causes sending of a priority request to said base  
10 station via said transmission/reception processor.

1                   4.       The mobile station of claim 3, further comprising:  
 2                   a PPP keep alive timer which begins counting from a time of any of a last  
 3 signal transmission and a last signal reception;  
 4                   wherein upon timeout of said PPP keep alive timer, said control section  
 5 causes sending of said base station said priority request, and restarts said PPP keep alive  
 6 timer.

1                   5.       The mobile station as defined in claim 4, wherein,  
 2                   if said radio channel is used preferentially, said control section sets a  
 3 counting period for said PPP keep alive timer to a value smaller than a channel holding  
 4 period, said channel holding period being a time measured from any of a last signal  
 5 transmission and a last signal reception, and until said base station cancels a radio channel  
 6 assignment to said mobile station.

1                   6.       The mobile station as defined in claim 5, further comprising:  
 2                   a wireless channel state timer that counts said channel holding period; and  
 3 wherein  
 4                   if said wireless channel state timer reaches said channel holding period,  
 5 said control section discontinues sending said priority request.

1                   7.       A mobile station for wireless communication with a base station,  
 2 said mobile station having a control section comprising:  
 3                   a CPU,  
 4                   a memory,  
 5                   a bus, connecting said CPU, said memory to a transmission/reception  
 6 processor;  
 7                   wherein when said mobile station requests assignment of a wireless  
 8 channel from said base station, said CPU causes transmission of a preferential channel  
 9 assignment request via said transmission/reception processor.

1                   8.       The mobile station of claim 7, wherein said preferential channel  
 2 assignment request further comprises an identification of a preferential channel usage  
 3 request packet.

1           9.     A base station controller for controlling a base station, said base  
2 station communicating with at least one of a plurality of mobile stations, said base station  
3 controller comprising:

4                 a base station interface, connecting said base station controller to said base  
5 station;

6                 a control section;

7                 a network interface, connecting said base station controller to a network;

8                 a packet bus, interconnecting said base station interface, said network  
9 interface to said control section;

10                wherein said control section receives from at least one of said plurality of  
11 mobile stations a request to use a radio channel preferentially, through said base station,  
12 and responsive to said priority request, transmits an acknowledgement to said mobile  
13 station.

1           10.    The base station controller of claim 9, said base station controller  
2 further comprising:

3                 a state transition timer that counts a time period starting from at least one  
4 of a transmission to said base station and a reception from said base station, and until a  
5 channel assigned to said mobile station is released.

1           11.    The base station controller of claim 9, wherein said  
2 acknowledgement further comprises identification of an acknowledgement packet for said  
3 priority request.

1           12.    A base station controller for controlling a base station, said base  
2 station communicating with at least one of a plurality of mobile stations, said base station  
3 controller comprising:

4                 a base station interface, connecting said base station controller to said base  
5 station;

6                 a control section;

7                 a network interface, connecting said base station controller to a network;

8                 a packet bus, interconnecting said base station interface, said network  
9 interface to said control section;

10                    wherein said control section receives from at least one of said plurality of  
 11    mobile stations a request to use a radio channel preferentially, through said base station,  
 12    and responsive to said priority request, determines an availability of a channel to assign to  
 13    said mobile station.

1                    13.    The base station controller of claim 12, wherein responsive to a  
 2    request for a priority wireless channel assignment by a priority requesting mobile station,  
 3    and wherein, if there are no free wireless channels, said control section releases a wireless  
 4    channel assignment from a non-priority requesting mobile station, and assigns said  
 5    wireless channel so released to said priority requesting mobile station.

1                    14.    The base station controller of claim 13, wherein  
 2                    said control section releases wireless channels from said non-priority  
 3    requesting mobile station that has not transmitted nor received signals for a longest period  
 4    of time.

1                    15.    The base station controller of claim 13, wherein when priority  
 2    requesting mobile stations, moves from a control area of a first base station to a control  
 3    area of a second base station, and requests a wireless channel assignment from said  
 4    second base station, and wherein, if there are no free wireless channels, a control section  
 5    of a base station controller that controls said second base station releases a wireless  
 6    channel assignment from a non-priority requesting mobile station, and assigns said  
 7    wireless channel so released to said priority requesting mobile station.

1                    16.    The base station controller of claim 13, further comprising a link  
 2    layer connection control table for managing wireless channels used by each of said  
 3    mobile stations, and  
 4                    said link layer connection control table comprising a priority management  
 5    registration field, wherein  
 6                    said control section makes a priority management registration in said  
 7    priority management registration field for said priority requesting mobile stations.

1                    17.    The base station controller of claim 16, further comprising:  
 2                    a channel control table for registering said link layer connection control  
 3    table for each of said base stations; said channel control table comprising:

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4 a preferred mobile station control queue for registering said link layer  
 5 connection control table of a preferred mobile station which receives said priority channel  
 6 management from said base station controller, and  
 7 a non-preferred mobile station control queue for registering said link layer  
 8 connection control table of said non-preferred mobile station in ascending order of length  
 9 of time for which said non-preferred mobile station left said wireless channel unused.

1 18. The base station controller of claim 17, wherein said link layer  
 2 connection control table includes a uplink transmission speed field, and a downlink  
 3 transmission speed field, wherein  
 4 said control section calculates total transmission speed of all mobile  
 5 stations in a cell controlled by said base station, and  
 6 in case of said total transmission speed being over a threshold, said control  
 7 section releases said wireless channel from said non-preferred mobile station whose link  
 8 layer connection control table is registered last in said non-preferred mobile station  
 9 control queue.

1 19. The base station controller as defined in claim 17, wherein  
 2 said link layer connection control table includes a uplink SIR field, and a  
 3 downlink SIR field,  
 4 said control section calculates total SIR in a cell controlled by said base  
 5 station, and  
 6 in case of said total SIR being over a predetermined threshold  
 7 said control section releases said wireless channel from said non-preferred mobile station  
 8 whose link layer connection control table is registered at the last of said non-preferred  
 9 mobile station control queue.

1 20. A packet data service node for connecting a base station controller  
 2 with an external network, said packet data service node comprising:  
 3 a control section;  
 4 a routing section;  
 5 a bus, connecting said routing section to said control section  
 6 wherein, said control section, responsive to receiving through said base  
 7 station controller a priority request from a priority-requesting mobile station, sends to said

8 base station controller a reply to authorize priority processing, said reply enabling said  
9 priority-requesting mobile station to use a wireless channel preferentially.

1 21. The packet data service node of claim 20, further comprising:  
2 a mobile station information table for registering information about  
3 priority channel usage authorization.

1 22. The packet data service node of claim 21, wherein:  
2 said control section, upon receiving said priority request, refers to said  
3 mobile station information table and sends a reply to permit priority processing to said  
4 base station controller if said priority requesting mobile station has been registered for  
5 priority channel usage, otherwise sends a reply to disallow priority processing to said base  
6 station controller if said priority requesting mobile station has not been registered for  
7 priority channel usage.

1 23. A mobile communication system comprising:  
2 a base station controlled by a base station controller;  
3 at least one of a plurality of mobile stations, in communication with said  
4 base station using wireless communication channels, wherein  
5 said base station controller releases a wireless communication channel  
6 from said mobile station when no transmission nor reception between said mobile station  
7 and said base station occurs for a time period exceeding a threshold period, and wherein:  
8 a priority-requesting mobile station requesting a preferential use of a  
9 wireless communication channel sends a priority request to said base station; and  
10 said base station controller receives said priority request through said radio  
11 base station, and upon reception of said priority request, said base station controller  
12 transmits acknowledgement to said mobile station.

1 24. The mobile communication system of claim 23, wherein:  
2 said mobile station transmits said priority request periodically.

1 25. The mobile communication system of claim 23, wherein:  
2 said base station controller does not release said wireless channel when a  
3 prior channel usage contract of said mobile station is registered to a packet data service  
4 node to which said base station controller connected.

1           26.    A mobile communication system comprising:  
2                a base station controlled by a base station controller;  
3                at least one of a plurality of mobile stations, in communication with said  
4 base station using wireless communication channels, wherein  
5                said base station controller releases a wireless communication channel  
6 from said mobile station when no transmission nor reception between said mobile station  
7 and said base station occurs for a time period exceeding a threshold period, and wherein:  
8                a priority-requesting mobile station requesting a preferential use of a  
9 wireless communication channel sends a priority request to said base station; and  
10              said base station controller receives said priority request through said radio  
11 base station, and thereupon assigns said wireless communication channel to said priority-  
12 requesting mobile station.

1           27.    The mobile communication system comprising:  
2                a radio base station;  
3                a base station controller, operative to control said radio base station;  
4                at least one mobile station; wherein said at least one mobile station is in  
5 communication with said radio base station; and wherein  
6                said base station controller receives a wireless channel assignment request  
7 from said mobile station, which transmitted a priority request for requesting priority use  
8 of a wireless channel, and wherein, in case of shortage of wireless channels exists, said  
9 base station controller releases a wireless channel from a non-preferred mobile station,  
10 and assigns said released wireless channel to said requesting mobile station.

1           28.    The mobile communication system of claim 27, wherein said base  
2 station controller releases said wireless channel from said non-preferred mobile station  
3 which has not transmitted and/or received signals for a longest period.

1           29.    The mobile communication system of claim 27, wherein said base  
2 station controller releases said wireless channel when a prior channel usage contract of  
3 said channel assignment requesting mobile station is registered to a packet data service  
4 node to which said base station controller connected.

1           30.    The mobile communication system of claim 27, wherein said base  
2 station controller releases said wireless channel upon hand-off of said priority request  
3 transmitting mobile station.

1           31.    A mobile station according to claim 3,  
2 wherein said priority request comprises identification of a preferential channel usage  
3 request packet.

1           32.    A wireless communication method for establishing a priority  
2 communication channel, said wireless communication method comprising:  
3           transmitting a priority request for use of a wireless channel;  
4           setting a first timer with a timeout value less than a timeout value of a  
5 second timer;  
6           periodically transmitting said priority request at expiration of said first  
7 timer provided that said second timer has not expired; and  
8           wherein, responsive to said periodically transmitting said priority request,  
9 said priority use of said wireless channel is maintained.

1           33.    A wireless communication method for establishing a priority  
2 communication channel, said wireless communication method comprising:  
3           receiving a priority request for use of a wireless channel;  
4           determining that a priority usage of said wireless channel is permissible;  
5           setting a timeout value to a timer;  
6           releasing said priority usage of said wireless channel at expiration of said  
7 timer unless any of: a periodic priority request is received, a transmission is received and  
8 a transmission is made; and  
9           wherein, responsive to any of: a periodic priority request is received, a  
10 transmission is received and a transmission is made, said priority use of said wireless  
11 channel is maintained.

1           34.    The wireless communication method of claim 33, further  
2 comprising:  
3           transmitting an acknowledgement responsive to said priority request.



35. The wireless communication method of claim 33, wherein said determining that a priority usage of said wireless channel is permissible further comprises:

determining that said priority request is authorized under contract for priority usage.

36. A wireless communication method for establishing a priority communication channel, said wireless communication method comprising:

receiving a preferential channel assignment request;

determining that wireless channel resources are sufficient to fill said preferential channel assignment request;

if insufficient wireless channel resources exist to fill said preferential channel assignment request, releasing a wireless channel from another communication, and assigning said released wireless channel to satisfy said preferential channel assignment request.

37. The wireless communication method of claim 36, wherein said releasing a wireless channel from another communication further comprises:

releasing said wireless channel from a non-preferred communication which has not transmitted and/or received signals for a longest period.

38. The wireless communication method of claim 36, further comprising:

releasing said wireless channel upon a source of said preferential channel assignment request moving to a location serviced by a different cell.

39. A wireless communication apparatus for establishing a priority communication channel, said wireless communication apparatus comprising:

means for transmitting a priority request for use of a wireless channel;

means for setting a first timer with a timeout value less than a timeout value of a second timer;

means for periodically transmitting said priority request at expiration of said first timer provided that said second timer has not expired; and

8                    wherein, responsive to said periodically transmitting said priority request,  
9                    said priority use of said wireless channel is maintained.

1                    40.     A wireless communication apparatus for establishing a priority  
2                    communication channel, said wireless communication apparatus comprising:

3                    means for receiving a priority request for use of a wireless channel;  
4                    means for determining that a priority usage of said wireless channel is  
5                    permissible;

6                    means for setting a timeout value to a timer;

7                    means for releasing said priority usage of said wireless channel at  
8                    expiration of said timer unless any of: a periodic priority request is received, a  
9                    transmission is received and a transmission is made; and

10                   wherein, responsive to any of: a periodic priority request is received, a  
11                   transmission is received and a transmission is made, said priority use of said wireless  
12                   channel is maintained.

1                    41.     A wireless communication apparatus for establishing a priority  
2                    communication channel, said wireless communication apparatus comprising:

3                    means for receiving a preferential channel assignment request from a base  
4                    station controller, and

5                    means for transmitting a reply to authorize said base station controller to  
6                    assign a wireless channel preferentially.

1                    42.     A computer program product for establishing a priority  
2                    communication channel, said computer program product comprising:

3                    code that transmits a priority request for use of a wireless channel;

4                    code that sets a first timer with a timeout value less than a timeout value of  
5                    a second timer;

6                    code that periodically transmits said priority request at expiration of said  
7                    first timer provided that said second timer has not expired; and

8                    wherein, responsive to said periodically transmitting said priority request,  
9                    said priority use of said wireless channel is maintained; and

10                   a computer readable storage medium for holding the codes.

1                   43.     A computer program product for establishing a priority  
2 communication channel, said computer program product comprising:  
3                   code that receives a priority request for use of a wireless channel;  
4                   code that determines that a priority usage of said wireless channel is  
5 permissible;  
6                   code that sets a timeout value to a timer;  
7                   code that releases said priority usage of said wireless channel at expiration  
8 of said timer unless at least one of: a periodic priority request is received, a transmission  
9 is received and a transmission is made; and  
10                  wherein, responsive to at least one of: a periodic priority request is  
11 received, a transmission is received and a transmission is made, said priority use of said  
12 wireless channel is maintained; and  
13                  a computer readable storage medium for holding the codes.

1                   44.     A computer program product for establishing a priority  
2 communication channel, said computer program product comprising:  
3                   code that receives a preferential channel assignment request from a base  
4 station controller, and  
5                   code that transmits a reply to authorize said base station controller to  
6 assign a wireless channel preferentially; and  
7                   a computer readable storage medium for holding the codes.